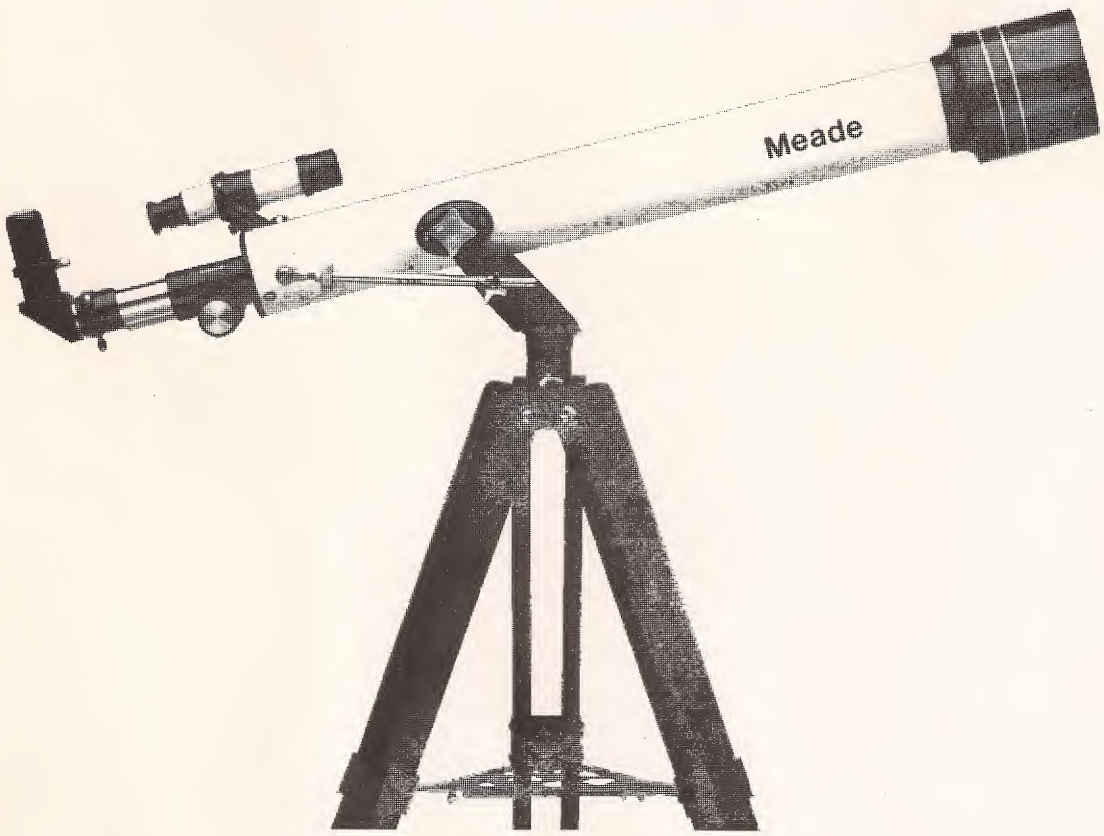
OPERATING INSTRUCTIONS

MEADE® MODEL 226W

2.4" (60MM) ALTAZIMUTH REFRACTING TELESCOPE



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WARNING: NEVER POINT THE TELESCOPE DIRECTLY AT OR NEAR THE SUN AT ANY TIME! OBSERVING THE SUN, EVEN FOR THE SMALLEST FRACTION OF A SECOND MAY RESULT IN INSTANT AND IRREVERSIBLE EYE DAMAGE, AS WELL AS PHYSICAL DAMAGE TO THE TELESCOPE ITSELF.

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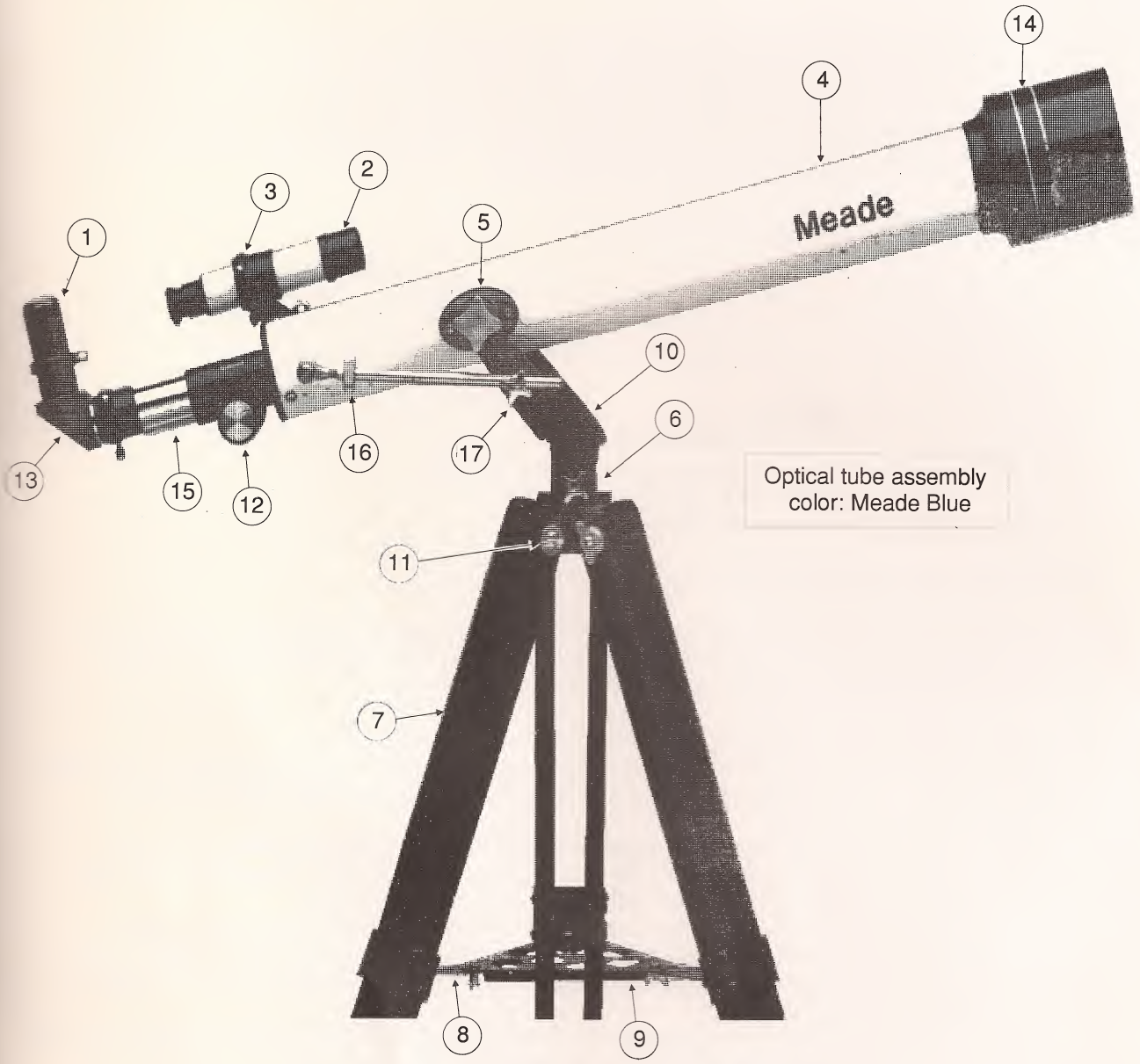

(Meade Model 226W similar to illustration above)

FIG. 1: Meade Model 226W 2.4" Altazimuth Refracting Telescope

1. Eyepiece
2. Viewfinder
3. Viewfinder collimation screws
4. Optical tube assembly
5. Vertical lock knobs
6. Horizontal lock knob
7. Tripod leg
8. Accessory tray supports
9. Accessory Tray
10. Altazimuth mount
11. Tripod attachment bolts
12. Focusing knob
13. Diagonal mirror
14. Objective lens cell
15. Focuser drawtube
16. Altitude rod slow motion fine adjustment control
17. Altitude rod coarse adjustment lock knob control

INTRODUCTION

This manual details the set-up, operation, specifications and optional accessories of the Meade Model 226W 2.4" (60mm) Altazimuth Refracting Telescope. The Model 226W is an easy to operate, high performance telescope designed for both astronomical and terrestrial observing. In order that you may achieve maximum utilization of the instrument, we urge that you take a few minutes to read all of this manual before making first observations through the telescope. As you read through this manual, the technical terms associated with telescopes will be made clear.

STANDARD EQUIPMENT: (Refer to Fig. 1)

- Complete optical tube assembly (objective lens diameter = 60mm (2.4"); focal length = 700mm)
- Full-length fully adjustable hardwood tripod and accessory tray.
- Kellner 25mm (28X), and 9mm kellner (77x) Eyepieces (.965" O.D. "Outside Diameter")
- Diagonal mirror (.965" O.D.)
- 5x24mm viewfinder with bracket
- Altazimuth mount with altitude slow-motion control.
- Hardware package: 3 bolts (3" long) with wing nuts and washers
  3 screws (1/2" long) with wing nuts
  All other necessary hardware provided in place.

UNPACKING AND ASSEMBLY (Note: Numbers in ( ) refer to Fig. 1)

Note that although the telescope is unassembled, all of the more difficult or complicated sections of the instrument are already factory pre-assembled; first time assembly of the telescope should not require more than about 15 minutes. To set up the telescope, follow this procedure:

1. Remove and identify the telescope's components, using the listing above.
2. The optical tube may need to be adjusted to a more horizontal position for easier assembly; loosen the altitude lock knob (17) and reposition the optical tube so as to provide easy access to the mount for attachment of the tripod legs (7).
3. Attach the 3 hardwood tripod legs (7) to the base of the altazimuth mount (10) with the 3 hinged accessory tray supports (8) facing inward. Three bolts (11), each about 3" long, with washers and wing nuts, are provided for this purpose at the end of the legs that attach to the mount.
4. Attach the accessory tray (9) to the tray supports with the short screws and wing nuts provided.
5. Adjust the sliding tripod legs to the desired height by loosening the thumb screw at the bottom of the unextended leg; then reposition the sliding center portion of the leg to desired height and firmly retighten the thumb screw to secure the leg(s).
6. Attach the viewfinder bracket (2) to the telescope using the 2 thumbscrews provided. (During shipment, these thumbscrews may be pre-threaded into the main telescope tube at the viewfinder location). The thumbscrews fit through 2 holes located at the base of the viewfinder bracket and thread into the main tube.
7. Insert the diagonal prism (13) into the focuser drawtube (15) and the Ke25mm eyepiece (1) into the diagonal mirror. Secure each in place with a moderate tightening of the respective thumbscrews. It is the eyepiece that determines the power at which the telescope is operating. Higher or lower power eyepieces are available to suit particular observing situations. The Ke25mm eyepiece, included as standard equipment, yields 28 power (written as 28X) with the Model 226W.
8. The telescope is now completely assembled. To move the telescope and point it from one object to another, first slightly loosen one of the chrome-look (star shaped) knobs (5) which serves as a vertical lock, as well as the azimuth (horizonal) lock (6). Also loosen the altitude coarse adjustment lock knob (17). Loosening these locks allows the telescope to be turned freely (vertically and/or horizontally) in any direction so that the telescope can be moved to locate and point at an object. Once a sky object is found the altitude coarse adjustment lock knob (17) can be tightened and the altitude slow motion fine adjustment control knob (16) can then be used to effect very smooth and accurate tracking in the vertical axis.

ALIGNING THE VIEWFINDER

The 5x24mm viewfinder permits easy object sighting prior to observation in the higher-power main telescope. To align the viewfinder, follow this procedure:

1. With the Kellner 25mm eyepiece in place in the diagonal prism, as described in paragraph 6 , point the *main* telescope at some well defined land target (e.g. the top of a telephone pole) at least 200 yards distant.
2. Look through the viewfinder and tighten or loosen, as appropriate, the viewfinder's 3 collimation (alignment) screws located on the back of the finderscope bracket (3), until the cross hairs of the viewfinder are precisely centered on the same object already centered in the main instrument's field of view.
3. With this alignment accomplished, objects located first in the wide-field viewfinder will then be centered in the main telescope's field of view. (Note: The viewfinder presents an image which is upside-down and reversed; this is customary in all astronomical viewfinders).

Focusing the viewfinder's image is accomplished by turning the threaded eyepiece of the viewfinder.

USING THE TELESCOPE

With the telescope assembled as described above, you are ready to begin observations.

1. First decide on an easy to find object. Land objects during the daytime are a good way to become accustomed to the functions and operations of the telescope. At night, try observing the Moon first, if it is visible, or a bright star.
2. To center an object in the main telescope, use the viewfinder to first sight in the object you wish to observe. Always use the lower power Kellner 25mm (28X) eyepiece to find and center an object. Then switch to a higher power eyepiece such as the Kellner 9mm (77X) provided as standard equipment. (For other eyepieces, see OPTIONAL ACCESORIES, page 7). The Kellner 25mm eyepiece included with the Model 226W presents a wide field of view, ideal for terrestrial observing or for the observation of star fields and star clusters.
3. If you are observing an astronomical object (the Moon, a planet, star, etc.) you will immediately notice that the object is in rather slow but continuous motion through the telescopic field of view. This motion is caused by the rotation of the Earth on its axis which results in an apparent motion of the object in the telescope's field of view; i.e. although the Moon, planets and stars are, for practical purposes, fixed in their positions during any 2 or 3 hour observing session, the platform on which the telescope is sitting (the Earth) rotates once every 24 hours underneath these fixed objects. To keep astronomical objects centered in the field, simply move the telescope on one or both of its axes (vertical and/or horizontal) as appropriate. The altitude slow motion fine adjustment control will allow for very smooth incremental verticle movements; be sure the altitude coarse adjustment lock knob has been tightened before using the fine adjustment control knob. You will notice at higher powers, astronomical objects will seem to move through the field more rapidly.
4. Avoid touching the eyepiece while observing through the telescope. Vibrations resulting from such contact will cause the image to move.
5. Allow a few minutes for your eye to become "dark adapted" before attempting serious astronomical observations.
6. Avoid setting up the telescope inside a room and observing through an open window (or worse yet, a closed window). Images viewed in such a manner may appear blurred or distorted due to temperature differences between inside and outside air.
7. We repeat the warning stated at the outset of this manual: **NEVER POINT THE TELESCOPE DIRECTLY AT OR NEAR THE SUN AT ANY TIME! OBSERVING THE SUN, EVEN FOR THE SMALLEST FRACTION OF A SECOND, MAY RESULT IN INSTANT AND IRREVERSIBLE EYE DAMAGE, AS WELL AS PHYSICAL DAMAGE TO THE TELESCOPE ITSELF.**

8. The Meade Model 226W may be used for a lifetime of rewarding astronomical and terrestrial observing, but basic to your enjoyment of the telescope is a good understanding of the instrument. Read the above instructions carefully until you understand all of the telescope's parts and functions. One or two observing sessions will serve to clarify these points forever in your mind.
9. The number of fascinating objects visible through your Meade refractor is limited only by your own motivation. Obtain a good star atlas (see "Meade Star Charts" in OPTIONAL ACCESSORIES, page 8) and read the listings of objects visible through 60mm (2.4") telescopes. These objects include:

- Cloud belts across the surface of the planet Jupiter.
- The 4 major moon's of Jupiter, visible around the planet ,changing position each night.
- Saturn and its famous ring system.
- The Moon: a veritable treasury of craters, mountain ranges and fault lines.
- Deep-Space: Nebulae, galaxies, multiple star systems, star clusters—hundreds of such objects are visible through the Model 226W.
- Terrestrial objects: Your Meade telescope may also be used for high resolution land viewing. In this case, note that the diagonal prism results in an image which is reversed left-for-right, but which is correctly oriented up-and-down. For a fully corrected image, the #927 45° Erect Image Roof Prism (.965" O.D.) is required. See "OPTIONAL ACCESSORIES", page 7. Terrestrial observations should almost always be made using a low power eyepiece (50X or less) for bright, sharp images. Land objects will not normally accept higher powers well because the telescope is being pointed through the thickest part of the Earth's atmosphere, unlike astronomical observations made by pointing the telescope up and through the atmosphere.

CALCULATING POWER

The power, or magnification, at which a telescope is operating is determined by two factors: the optical, or focal length of the telescope's main (objective) lens and the focal length of the eyepiece being used.

The focal length of the Model 226W's objective lens is 700mm. To compute power, divide the focal length of the eyepiece into the focal length of the objective lens. The resulting quotient is the magnifying power of the telescope when used with the eyepiece in question. For example, the Kellner 25mm eyepiece yields with the Model 226W, a power of:

Power = 700mm ÷ 25mm = 28

Similarly, if the Kellner 9mm eyepiece is used, the resulting power will be 700mm ÷ 9mm = 77X. The letter "Ke" refers to the "Kellner" optical design (3-element) which yields very well corrected images with refracting telescopes and is generally preferred over the more common Huygens, "H", (2-element) because of its higher quality and better eyerelief for more comfortable viewing. The optical design of the eyepiece has no bearing on power, however. The Meade Series 2 Orthoscopic eyepieces (4-element) described in "OPTIONAL ACCESSORES" on page 7 of this manual present extremely sharp, well resolved images through the Model 226W throughout a wide range of magnifications.

A few words of wisdom about power. Why not 1000 power or more? Meade is a serious telescope manufacture known for quality and honest marketing. The theoretical power or magnification with a telescope is virtually limitless. However, there are practical limits imposed by the earth's atmosphere and optical resolution as to what can be seen well at a given power. The most often useful higher magnification with ***any*** 60mm diameter telescope is in the range of 90 to 120 power. The general rule to use with any telescope, regardless of size: Only use as much power as a good image supports; this often varies with the stability of the air being viewed through and is one reason why having various eyepieces is useful. Higher powers are no guaranty of better images, in fact the opposite is often true. Meade has attempted to maximize the performance of your telescope for the most useful power range to provide the greatest possible utility and enjoyment.

MAINTENANCE

As with any quality optical instrument, lens surfaces should be cleaned as infrequently as possible. A little dust on the surface of the objective lens causes negligible degradation of image quality and should not be considered reason to "clean" the lens. When lens cleaning does become necessary, use a camel's hair brush or compressed air to gently remove dust. Wipe only with a soft, clean cloth, applying as little pressure as possible to avoid scratching glass surfaces.

SPECIFICATIONS

Objective (main) lens focal length	700mm
Objective lens diameter	60mm (2.4")
Focal ratio	f/11.7
Mounting type	Altazimuth

OPTIONAL ACCESSORIES

See your Meade dealer for further details on any of these accessories.

#927 45° Erect-Image Roof Prism (.965" O.D.): Correctly orients the telescopic image during terrestrial observing and yields an image position at a 45° angle to the main telescope tube, resulting in a more comfortable observing position in most cases.

Additional Eyepieces (.965" O.D.): The Meade Series 2 eyepieces listed below present extremely sharp, highly resolved images in the Model 226W throughout a wide range of magnifications. Each eyepiece is shown with its optical type (OR = Orthoscopic; MA(Ke) = Modified Achromatic(Kellner) and the power obtained when used with the Model 226W telescope:

Eyepiece	Power When Used with Model 226W
OR4mm	175X
OR6mm	117X
OR9mm	78X
OR18mm	39X
OR25mm	28X
MA40mm*	18X

*The MA40mm eyepiece is an excellent low-power, wide field ocular, highly recommended for terrestrial applications or for observing large star fields.

Meade Star Charts: Bound 12" x 14" charts printed on heavy, coated paper, suitable for field use. Includes listings and mapped locations of hundreds of interesting deep space objects for observation through the telescope.

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